2: Hockings E-4,5 (1962-1977) 1980
AW50 Badaga AW50

133 dissimilar parts by a range of heights running north and south of which Dodabetta ('big mountain') is the tallest . . .

311 East and south of the Dodabetta range . . . the plateau . . . is
318 extensively cultivated by the immigrant tribe known as the
137 Badagas. This does not improve its appearance; the great
forests have mostly been felled and their place taken by the
• 134 poorest low scrub or by fields of miserable cereals surrounding the squat red-tiled houses of numerous hamlets; the country is deeply scoured by every shower of rain until the infertile red and yellow sub-soil clays are laid bare; and, owing to the Badagas' former custom of shifting their cultivation from year to year to new patches of land, grass has been prevented from getting any firm hold on the denuded hill-sides. Only on the slopes of the plateau (which are too steep for cultivation) and in a few isolated Government reserves, does the forest flourish in its virgin beauty.

133 West of Dodabetta, however, the Badagas are more rare;
137 hardly a field or a village (except the little clusters of huts
belonging to the pastoral Tōdas) is to be seen; and the country
[311] consists of a sea of rounded green hills, rising now and again into more prominent heights and ranges, which are covered with short grass . . . These rounded hills are divided each from each by streams or bogs, and nestling in their wrinkles are beautiful little woods, . . . the edges of which have been so sharply defined by years of grazing and (perhaps) grass fires that they look almost like artificial plantations. . . .(Francis. 1908, 3–5).

128 A few of the village names defy any interpretation—either by me
103 or by my best informants—probably because they have changed too much to be recognizable now as Baḍagu substantives. But leaving these aside we still have in the list of toponyms which follows a corpus of 311 meaningful toponyms for a community of about 362 hamlets, 18 of them no longer occupied. Some toponyms are repeated in several places, (e.g., Naḍuhaṭṭi, 'middle hamlet', or Hosaṭṭi, 'new hamlet'); numbers given after some explanations indicate where such a toponym occurs more than once in the Nilgiris. We will now examine the meanings of the toponyms, which are given here in a phonemic transcription of Badagu (a Dravidian language).

41 Hockings E-5 (1962-1977) 1980
AW50 Badaga AW50

(2) The lower plateau, ranging from about 5,000 to a peak at 8,640 feet, where over 350 Badaga hamlets are located. (3) The escarpments and lower slopes, primarily the home of the Kurumba and Irula tribes, who are swidden cultivators still practising some hunting and gathering, and important to Badagas for their sorcery. (4) The more westerly Waina:ḍ Plateau, averaging about 3,000 feet in elevation, which is the territory of Kurumbas, Paniyas, Maunta:-dan and Waina:ḍ Chettis, and of eight hamlets of Badagas, here known as Waina:ḍ Gaudas. Irrigated rice, and tea and coffee, are the most important crops there today.

Since the culture of the Waina:ḍ Gaudas has been dealt with elsewhere (Ranga 1934; Hockings 1979a), and in any case is more like a variant subculture of the Maunta:dan Chettis than like that of the Nilgiri Badagas, I will pay no attention to them in the present study, but confine myself to the Badagas of the Nilgiri Massif.

The environs of these Nilgiri Badagas have been discussed in some detail in a paper on Badaga placenames and cultural ecology (Hockings 1974), and have been accurately described in the following account of the lower and upper plateau:

> The plateau is a true tableland, its average height being very uniform. But there is not a square mile of level ground in the whole of it, its surface being broken by endless undulations which in places swell into considerable and distinct ranges. It rises most abruptly from the plains below it; and on the west. . .its sides are often sheer, bare walls, hundreds of feet in height and too steep even for trees to obtain a footing on them. Elsewhere dense forest covers almost the whole of its slopes.
>
> It is first of all divided east and west into two fairly equal but dissimilar parts by a range of heights running north and south of which Dodabetta ('big mountain') is the tallest. . . .
>
> East and south of the Dodabetta range. . . the plateau. . .is extensively cultivated by the immigrant tribe known as the Badagas. This does not improve its appearance; the great forests have mostly been felled and their place taken by the poorest low scrub or by fields of miserable cereals surrounding the squat red-tiled houses of numerous hamlets; the country is deeply scoured by every shower of rain until the infertile red and yellow sub-soil clays are laid bare; and, owing to the Badagas' former custom of

4: Hockings E-5 (1962-1977) 1980
AW50 Badaga AW50

241 318 (134) (137) shifting their cultivation from year to year to new patches of land, grass has been prevented from getting any firm hold on the denuded hill-sides. Only on the slopes of the plateau (which are too steep for cultivation) and in a few isolated Government reserves, does the forest flourish in its virgin beauty.

West of Dodabetta, however, the Badagas are more rare; hardly a field or a village (except the little clusters of huts belonging to the pastoral Todas) is to be seen. (Francis 1908: 3-4)

121 Let us then see how, against this backdrop, several hundred Badaga therapists have over the centuries developed a unique medical adaptation to a unique tropical montane environment.

Badaga Medical History

1.5. The history of health care among the Badagas is entirely speculative. Nonetheless the history of the community itself is clear enough, and on this framework (Hockings 1979a) we can at least postulate three phases in the development of Badaga therapy (1.5-1.8). This sketch may later prove inadequate, for it is largely guesswork, but heuristically necessary for our understanding of problems connected with the elaboration of a specifically Badaga montane curative system from its roots in a very different equatorial environment at a much lower elevation.

175 (166) The first phase began after the year 1565 with the fall of the Vijayanagar Empire. It was this political act and the associated Muslim invasion that impelled the initial Badaga refugees to leave the plains of Mysore District and settle on the much higher Nilgiri Massif immediately to the south. These people were a mere fortuitous selection of one or two hundred from those who made up the vast genetic pools of the Mysore castes; but after settling on the hills their patterns of intermarriage were such that they became more like another isolate. Despite a preference for endogamy, though, their pool was repeatedly augmented by the arrival of occasional new settlers from the Mysore Plains who were accepted into the growing Badaga community.

175 143

175 64 75 A century or so after these first settlers arrived, some refugees forming the Kaṇakka clan also came to the Nilgiris. Their special importance lay in the fact that until the mid-nineteenth century the Kaṇakkas were the only Badagas who were somewhat literate. As

4: Hockings E-5 (1962-1977) 1980
AW50 Badaga AW50

by Badaga infants. One would certainly expect pregnant women and plantation labourers to be the people suffering most from mineral deficiencies in their diet. One clay sample from Ootacamund, of the kind that Badagas eat, had the following chemical components (Hooper and Mann 1906: 262):

Loss on ignition—	9.63%
(including nitrogen)	0.23%
Silica	71.66%
Feric oxide	2.71%
Alumina	4.94%
Lime	5.78%
Magnesia	1.54%
Potash	0.88%
Soda	1.01%
Sulphuric acid	0.06%
Phosphoric anhydride	1.79%

Gopi mud was a clay that used to be mixed with water and left to stand in the house. Later the water developed a salty taste and would be used in cooking (Belli Gowder 1923-41: 2).

Liquor

2.5. There is no doubt that the British introduced the Badagas to the demon drink, for their earliest reports on the community make it clear that "Liquors of an intoxicating quality are never distilled on the hills nor drunk by any of the castes" (Macpherson 1820: lix; cf. Ainslie 1834: 36). Yet by 1829 local Englishmen had brewed beer "from malt of Native Manufacture" (Price 1908: 218). By 1847, as we have already mentioned, Ootacamund had become a centre of "widespread and continuous drunkenness amongst low-class natives" (Price 1908: 51). For nearly a century following that date there are occasional complaints in the literature about the drunkenness of Badagas. Even today it is usually possible to see one or two drunken men in any village in the later afternoon, particularly on festival days.

The local liquor industry has fluctuated with repeated attempts to enforce prohibition, both before and after Independence. At the present time prohibition is once again the law. The women rarely

[TEXT CONTINUED ON PAGE 33]

132 rainfall at Calicut was 32.46 inches, but in 1918 only 7.09 inches fell during this month, whereas in 1937 rainfall for the month amounted to 59.21 inches. At Coimbatore mean October rainfall was 6.31 inches, but rainfall during this month varied from zero in several years to 16.25 inches in 1930. At Ootacamund mean July rainfall was 8.36 inches but this month's rainfall fluctuated from 1.94 inches in 1917 to 25.08 inches in 1903. Mean October rainfall at Ootacamund was 7.98 inches, but rainfall during that month varied from 1.97 inches in 1938 to 13.46 inches in 1939.

As one ascends the mountains temperatures naturally become lower. Although snow has never been recorded on the Nilgiris, frost occurs quite frequently during the dry season. At Nanjanad, in a period extending from 1930 to 1954, there was an average of four frost-days in November, nine frost-days in February, and three frost-days in March (Balasubramanian and Bakthavathsala 1956: 404). It is no wonder that English colonials once made the Nilgiris a resort area and governmental center during the hot season, for the climate on the massif's summit (Koeppen-Cwbig) is similar in many ways to that of England. According to Koeppen, Malabar has a monsoon climate (Amig) and the Central Plain has a tropical steppe climate (BSh). There are thus noticeable climatic differences between the Malabar coast and Central Plain.

3. Soils

134 Remnant hills in Malabar are frequently covered by laterites resulting from intensive weathering and soil formation extending over

6: Noble K-4,5 (1962-1963) 1989
(1800-1963)
AW50 Badaga AW50
Kota AW55
Kurumba AW56
Toda AW60
Madras Tribes AW63
Kasuva

• 134 a long time period.[3] In advanced soil profiles rarely thicker than 25 feet there will be pisolitic laterite near the surface and vermicular laterite farther below. Pisolitic laterite contains iron concretions sometimes coalesced into slag-like material, whereas vermicular laterite has many irregularly shaped tubes usually filled to varying degrees with kaolinitic clays. The most advanced profiles are found on well-drained, highly weathered, flat to low gradient land ranging from 50 to 600 feet in elevation. On steeper slopes where erosion has prevented more deeply weathered profiles from forming, or on flatter areas (including valley terraces) where insufficient weathering through time has impeded the development of deeper profiles, soils may contain only pisolitic laterite. Elsewhere, covering varying gradients and terrain positions, there are soils with different thicknesses of massive kaolinitic clays. These may be called lateritic clay, lithomargic, or red, brown, and yellow soils. A layer of pisolitic laterite will sometimes form near the surfaces overlying these soils (Fox 1936: 399-400; Lake 1891: 224-225, 228-229; Mohr and Van Baren 1954: 154; Raychaudhuri 1941: 232; Satyanarayana and Thomas 1961: 109-117).

The laterization process leading to formation of the above-mentioned soils is associated with concentration of aluminum plus iron oxides through upper profile disilication and leaching out of remaining bases. Red, brown, and yellow soils are formed first, pisolitic laterite is developed later, and vermicular laterite represents the climax stage. Good drainage is essential in the laterization process, and high temperatures, which accelerate chemical reactions, plus

6: Noble K-4,5 (1962-1963) 1989
(1800-1963)

AW50 Badaga AW50
Kota AW55
Kurumba AW56
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134 enough rainfall to ensure leaching naturally help. Evaporation combined with upward capillary movement of water evidently play a vital role in pisolitic laterite formation. Downward and upward water flushing appears essential to vermicular laterite formation in Malabar. This flushing is brought about mainly by fluctuations in groundwater from season to season. Once vermicular laterite has formed, it in turn will aid in drainage and water storage. Rainwater on sections underlain by vermicular laterite drains below the surface [133] rapidly. Because this type of laterite contributes to water retention, rivers and streams continue to flow throughout the dry season (Lake 1891: 237; Logan 1887, 2:33).

133 134 Although higher elevations temper climate, tropical influences remain strong in mountain and plateau regions. Weathered rock in even the highest parts of the Nilgiris often forms a 40 to 50 foot mantle, and borings at the Sandy Nala dam (close to 7,000 feet) indicated a mantle thickness of 130 feet (Krishnan 1958b: 177). There are also many exposures of parent rock, especially on ridge tops. Due to downward erosion of sediments, landslides, and soil-creep, weathered debris plus soils accumulate toward valley bottoms. Thus, soils tend to be thicker on or near valley bottoms and thinner upslope. Laterization is responsible for the prevalent red, brown, 134 and yellow soils of greatly varying thicknesses. There are also scatterings of pisolitic laterite (Benza 1835: 417-419; Blanford 1859: 221, 235-237; Grigg et al. 1880: 464). Although there may be some localized occurrences, no clear-cut evidence exists for the presence of vermicular laterite on the Nilgiris.[4]

6: Noble K-4,5 (1962-1963) 1989
(1800-1963)
AW50 Badaga AW50
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0134 Some of the upland soils are the result of processes other than laterization. In depressions where water tends to accumulate and oxidation is resultantly slower, dark brown to black soils will form. Such soils are found in Nilgiri bogs and Wynaad swampy depressions. Nilgiri black bog soil, which crumbles to powder or breaks into prismatic masses when dry, obviously has a high organic content (Benza 1835: 417). In 1857 peat from Nilgiri bogs was being used by the English for fuel (Cleghorn 1861: 178-179). Some grassland soils have certainly been formed in part by biotic influences. Annual fires combined with repeated cropping by domesticated buffaloes produced soil aridity and reduced humidity in air layers adjacent to the ground. Because grass has long grown on these soils, there is often a dark brown to blackish layer next to the surface. In forests at higher elevations there are accumulations of decomposing organic material on the ground, and soils immediately below appear to be darkened by humus carried down. Whether or not podsolization is operative to some degree at higher elevations is an unsettled question, but it seems likely that in forested areas this process is partially active.

The steppe climate of the Central Plain inhibits weathering and soil laterization. As a result, soils are shallow and vary from black to red in color. Within the climatic limits, drainage is the main determiner of whether a soil will be black, red, or some shade between. Red soils occur on higher sloped ground, and exist because there has been effective drainage leading to leaching and oxidation in their profiles. Laterization has taken place in these soils, but

134 not to the degree that it has in more humid areas to the west. Red soils grade to brown and then black soils, which are commonly called black cotton soils. Black soils, often varying from three to five feet in thickness and covering low-lying terrain, offer every evidence of ineffectual laterization. They are comparatively rich in silica and deficient in aluminum-iron content throughout their profiles, are base-saturated (mainly calcium), and usually have a granular to crumb structure. At lower levels in the profiles calcium concretions, called kankar in India, will often accumulate. The typical clays of the black cotton soils are montmorillonitic, so soil cracks tend to form in the dry season. Although these soils have a low humus content and are calcareous near the surface, they are in other ways similar to Russian chernozems. They might, therefore, be called tropical chernozems (Basu and Sirur 1939: 640-645, 690-696; Mohr and Van Baren 1954: 179-180, 422-426; Mukerji and Agarwal 1943: 587-588, 596-597; Raychaudhuri, Sulaiman, and Bhuiyan 1943: 264-272; Visvanath and Ukil 1944: 344, 361-362).

4. Vegetation

137 Moist deciduous forests, found only in remnant patches on Malabar plains, cover western Nilgiri and Wynaad slopes up to an elevation of approximately 2,500 feet (Figure 5).[5] Broadleaved trees growing to heights of over 100 feet may form a continuous canopy. Because most trees estivate in the dry season, the forests then assume a parched brown appearance. Axlewood (Anogeissus latifolia Wall.), matti (Terminalia tomentosa Bedd.), poomaradsy (Terminalia paniculata Roth.),

[TEXT CONTINUED ON PAGE 301

6: Noble K-4,5 (1962-1963) 1989
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AW50 Badaga AW50
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NOTES

000 [1]Holland (1900: 142, 151, 156, 166) considered Charnockites to be a suite of igneous intrusives ranging from acid to intermediate to ultrabasic and associated commonly with a particular hypersthenic rock he named charnockite. Subramaniam (1959: 326, 328-329, 345) defined charnockite "as a hypersthene quartz felspar rock with or without garnet, characterized by greenish flue felspar, and greyish blue quartz, the dominant felspar being a microperthite." The same writer applied the term Charnockite Suite to only the rocks in Holland's acid division, which consist of alaskite, charnockite, enderbrite, and quartzsyenite. Holland's intermediate division is considered a hybrid produced by mixing of pyroxene granulites with Charnockitic magma, while the basic division is a modified basement rock and the ultra-basic division, a syntectonic lens. Charnockites mentioned in this work belong to the larger rock suite.

[2]Climatic data came from these sources: Francis 1915: 16; Indian Meteorological Department 1953: 345-346, 359-360, 421-422; Logan 1887, 2: ccxxxi; Nicholson 1887: 556-567.

[3]Cf. Mohr and Van Baren 1954: 356-357, "It is also reasonable to presume that many of the red loams of today will be the lateritic cuirasses [ferruginous and aluminous laterites] of a million years from now."

•134 135 [4]Cf. Birch 1838: 94, "The laterite is the most valuable, as it can occasionally be used for building, when it is superficial, as then it can be wrought with little trouble when newly exposed." Ouchterlony 1848: 3, "A bed of this rock occurs near Kaitee sufficiently indurated to be fit for quarrying for building purposes--but no use is made of it by settlers owing to it being more costly than bricks." In 1963 the writer found some vermicular laterite on a wall at Koshthiemad, in the Kundah Range.

137 121 [5]Classification of vegetational associations is based on the following sources: Agrawal 1961a: 94-100; Agrawal 1961b: 309-315; Agrawal et al. 1961: 376-389; Crigg et al. 1880: 99-103; Champion 1935; Chandrasekharan 1962: 660-674, 731-747, 837-848; Fisher 1921: 8-13; Kadambi 1950: 18-30, 69-82; Shankarnarayan 1958: 90-98; Shankarnarayan 1959: 14-18.

In order to standardize species classification, these works were consulted: Blatter 1926; Bor 1954; Bor 1960; Fyson 1932, 1, 2; Gamble 1896; Hooker 1875-97, 1, 2, 3, 4, 5, 6, 7.

137 If imported species continue to be planted, they may some day be the dominant vegetative forms on the upper Nilgiris.

Temperate grassland formation. Annual fires set by men have
137 certainly contributed to grassland formation on the upper Nilgiris.
318 There is much historical evidence for the burning of old, tough, dried grasses to promote the growth of young, tender grass more edible for livestock (Appendix C). Badagas, Kotas, Todas, Cannarese, Malayalees, and Tamilians inhabiting the upper Nilgiris still burn grasses annually. Firing of grasslands is such a deeply ingrained practice that the Madras Forest Department encounters many difficulties in trying to enforce laws to protect forested or planted tracts. A record dating to A. D. 1117 contains the earliest mention of a Nilgiri ethnic group (Derrett and Duncan 1957: 47). The Todas referred to were in all likelihood pastoralists who fired grasses annually. If one thinks in terms of grasslands being burned over annually for centuries and possibly millennia, it is not difficult to envision grasslands expanding at the expense of adjacent forests. Every time flames cross grassy areas and reach shola edges they do some damage to trees. In turn, damaged trees are more easily attacked by diseases and insects. Slowly, through the years, trees along shola edges perish and grasses can then advance a little more.

Terrain on the upper Nilgiris is conducive to fire spread, for
133 the region is characteristically eroded into rounded highland hills
(134) and mountains. Whenever forests are destroyed, sheet erosion removes
132 soil, and relief features then tend to become more rounded. Although

the upper Nilgiris because of an annual dry season and the fact that they are planted on grasslands where conditions are less humid than in shola interiors. Less humid conditions tend to be continued in acacia and eucalyptus stands. Grassland soils are not conducive to shola growth, and soils under imported tree species tend to remain insufficiently improved to support a shola association. Under eucalyptus trees erosion is sometimes so intense that soil conditions for shola species are actually worsened. However, certain indigenous plant species may be able to successfully compete with imported trees. Through slow plant succession conditions below and above ground level may ultimately be bettered enough for a shola association to be favored over foreign trees.

Many shola species are extremely exacting in their growth requirements. For instance, outstanding requirements of many temperate evergreen species are soil and above-surface humidity conditions not met with on open grasslands. To provide these conditions alone, it would appear that a long, slow, uninterrupted succession of plants would have to live and die before a shola association could become established. Plants playing an important role in this succession would be the colonizing, fire-resistant rhododendrons, shrubs, and herbs now growing on the grasslands (Plate V, D). Fires and grazing animals now generally prevent the succession from taking place.

Tropical and subtropical savannas. The vegetative cover of savannas varies from dominating grasslands to dominating forests with grasses and shrubs between trees. Bamboos found in more humid areas